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VEB CHEMIE BITTERFE

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Liq. phase hydrogenation with suspended catalyst - with reactants
vibrated by pulsator, in tubular reactor
C86-000085

In liq. phase hydrogenation, the cpd. to be hydrogenated, in fluid form, together with finely divided suspended catalyst, is contacted with H_2 gas in an appts. operating on the loop principle.

The appts. consists of a reaction tube at any inclination, with a heat exchange jacket and static mixing units. The reactor contents are vibrated, with or without pressure, by a pulsator.

ADVANTAGE

Strongly exothermal hydrogenation, e.g. of nitro cpds. to amines, can be carried out. Reaction may be under quasi-kinetic conditions. Reactant vols. are smaller for the same throughput.

PREFERRED PROCESS

Hydrogenation is continuous, with the catalyst largely recycled into the reactor with a partial stream of prod. Opt.,

the catalyst may be (partly) removed from circulation and made up or replaced with fresh catalyst. The static mixing units may be of the same or different structure, and be arranged over the whole or part length of the reactor. The oscillations caused by the pulsator have a frequency of up to 30,000 (30-3000)/min., with a variable amplitude.

Several reactor tubes may be connected, with separate or combined heat exchange jackets, to form one reactor unit, with a combined pulsator or independent pulsators.

EXAMPLE

During 5 h, 10 l. of a methanolic soln. contg. 453 g/l of 4-nitro-toluene was hydrogenated with H_2 at 100°C and 3 MPa in presence of 10g of "Kt 6500" (RTM: supported Ni catalyst), with a pulsation frequency of 300/min and an amplitude of 5 mm. Sepn. gave 3397g of prod. contg. 99.6% of 4-toluidine and no detectable 4-nitrotoluene (96% yield). (15pp510RBHDwgNo 0'0).

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